

PROJECT NUMBER: 2106
PROJECT TITLE: Cigarette Performance and Design
PROJECT LEADER: R. W. Dwyer
PERIOD COVERED: June, 1988

I. LOW-DENSITY ROD DELIVERIES (B. Dwyer)

- A. Objective: Determine the effects of tobacco-rod densities on tar deliveries.
- B. Results: A computer model has been developed which predicts the tar deliveries of cigarettes as functions of tobacco-rod density, wrapper permeability, filter pressure drop, and filter ventilation level. One goal of this study is to determine if a delivery/dilution advantage might exist with low-density tobacco rods. This was investigated by constraining the total pressure drops and tar deliveries of low-density rods to match those of current brands. Since the pressure drops across low-density rods are lower than conventional rods, it was thought that the filter pressure drop could be increased thereby increasing filter efficiency and allowing lower ventilation levels to achieve the same total tar delivery.
- C. Conclusion: Low-density tobacco rods have lower pressure drops and higher tar deliveries than conventional rods. Because the deliveries are higher, they require higher pressure-drop filters to keep the tar at the same level as in the controls. Therefore, there does not appear to be any significant dilution advantage in these products. For example, we calculate that 54% ventilation is required in a MUL with a rod density of 0.18 g/cc in order to match the tar delivery of a conventional MUL at the same total-cigarette pressure drop. This compares with a filter ventilation of 54% observed in the current MUL from the 3/88 CI Report.

II. TOBACCO-ROD PRESSURE DROPS (M. White)

- A. Objective: Determine the effects of cigarette design on tobacco-rod pressure drops.
- B. Results: The analysis of data from an experimental study has been completed. The design characteristics investigated included tobacco-rod density, shred cut width, rod length and circumference, and filter ventilation level. We now have the capability of calculating the rod pressure drops as functions of these design parameters.
- C. Conclusions: The pressure drop across a tobacco rod is a second-order function of ventilation, linear with length, inversely proportional to circumference squared, and a fourth-order function of rod density.